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## BULLETIN No. 21

Department of Agriculture

# Methods of Soil Cultivation

Underlying Successful Grain Growing  
in the Province of Saskatchewan

Being the revised reports of two addresses delivered by the  
Honourable W. R. Motherwell, Minister of Agriculture,  
before the Dry Farming Congress.

PUBLISHED BY DIRECTION OF THE HONOURABLE W. R. MOTHERWELL,  
MINISTER OF AGRICULTURE



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# FIRST ADDRESS

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## WHAT GOOD SOIL CULTURE HAS DONE FOR SASKATCHEWAN.

### *What Early Settlers Found.*

Agriculture, either scientific or otherwise in the Province of Saskatchewan, has a history of but a brief twenty-seven years. Prior to that the buffalo, the Indian and the Hudson's Bay Company practically reigned supreme. With the building of the Canadian Pacific Railway through this empire province, which contract was entered into in 1881, settlers in large numbers followed in the wake of that great enterprise. While these settlers were drawn largely from the agricultural classes, still, the conditions on the prairie were so entirely different that farming operations for many years afterward were anything but successful or remunerative.

It was noticed by the observing ones that the first crop on either back-setting or early done breaking was generally a bountiful one, yet the second, after fall or spring ploughing, would invariably be only about half as good, and there would sometimes be produced very little or no crop at all. Owing to the half-breed and Indian rebellion of 1885, many of the settlers were taken from their homesteads to transport supplies to the soldiers. As a result of this a great deal of land was not sown to crop that spring. After the suppression of the rebellion many farmers returned to their holdings and ploughed the land that they had not sown. It may be added that this ploughing being done late and with very imperfect machinery was anything but first class summerfallow. Notwithstanding this, however, the following year showed splendid results from the land thus treated. This season (1886) was one of the driest in the history of the country, not over two inches of rain falling during the growing season, and yet on land that was thus summer-fallowed or on back-setting well done, there was a crop of from fifteen to twenty bushels of wheat to the acre; but fall and spring ploughing resulted in total failures. This was a great mystery to the early settlers. It was quite clear that the satisfactory results came from a certain system of tillage and yet the reason was not apparent. The principles of capillarity and soil physics were not very well understood at that date, while packing the land for the best results in cereal growing was scarcely heard of. Thus, largely by accident, did many of the early settlers discover the advantages of a crop rotation that included summer-fallowing as its main stay and chief corner stone, and although they were somewhat slipshod at first, improved methods were adopted as farmers learned the secret of the success that attended this system of tillage.

### *Fundamental Truths Discovered.*

For ten or twelve years the early settlers struggled along with the many difficulties that beset pioneer life, but their greatest hindrance was their inexperience. Time, however, brought about wonderful changes, and eventually in Saskatchewan there was developed a class of practical and successful farmers who cannot be surpassed anywhere. They were trained in the hard school of experience and by intelligent observation of cause and effect.

It was noticed that when summerfallows were ploughed early and all vegetation kept down by surface tillage during the summer, the soil's capacity to store up moisture for succeeding crops was wonderfully increased. It was also noted that where subsequent packing occurred, either accidentally or otherwise, crops not only grew better but matured earlier. The results of these observations when put into practice convinced the farmers of the necessity of adopting a system of summer-fallowing every third or fourth year, and while this system is practised for several purposes, its primary object is the conservation of soil moisture.

New settlers, on arriving in Saskatchewan, are very difficult to convince that summerfallowing is necessary for this or any other purpose, while the land is in a state of virginity. The term "summer-fallow" usually suggests depleted soil fertility and the necessity for restoring it by such means as are available; but in Saskatchewan the primary object of summerfallowing is, as I have already intimated, to store up moisture to act as a reserve supply to be given off to succeeding crops. To summerfallow according to some of the old methods employed in many localities while the country was in its primitive state had very little effect in carrying out the main object in view. The usual custom was to let the intended fallow lie idle until about the first of July, at which time the weeds were waving in the wind and sometimes half way up the horses' sides, when a plough and chain were employed to turn this luxuriant crop of vegetation under. However this system, which neither encouraged the germination of weed seeds nor conserved moisture, but rather dissipated it, was soon abandoned in favour of the more enlightened methods of early ploughing, immediately after seeding, and frequent subsequent tillage, not only for the purpose of killing weeds, but also in keeping the soil in a proper condition to receive and retain the rainfall.

### *The Method of Summerfallowing.*

Of course no one method in all its detail is practised by our farmers in the various districts, for conditions differ even in this prairie country; but the proper method and the one practised by the most successful farmers in the older districts, is to give the intended summerfallow some form of shallow tillage during the previous fall, with disc, gang plow or cultivator, so that the soil will not only be in a proper condition to receive the melting spring snows, but also be in a state that will favour the rapid germination of a large percentage of weed seeds in the following spring. Immediately after seeding, this fallow land is then carefully ploughed, the depth to be determined by the character of the

soil, and the special object the farmer may have in view. The object of ploughing early is twofold. First, to stir the ground and put it in favourable condition to receive and absorb moisture; and second, to keep down the vegetation. The subsequent tillage, by harrow or cultivator, puts a nice soil mulch on the top, which is favourable to the rapid and continuous germination of the weed seeds in the soil, as well as to the forming of a fine tilth on the top to retain the rainfall that is received. The depth to which ploughing is done is dependent upon the amount of moisture that it is desired to store. If it is in a part of the province subject to drouth the ploughing is done deeply, thus increasing the store house for moisture. On the other hand, if this method is too conducive to luxuriant vegetation and slow maturity, a shallower furrow is turned. Early done breaking or what is known as back-setting, both of which are practically "summerfallowing the prairies," give the same good results as summerfallowed land. On the other hand it was found that fall and spring ploughing, when performed after the fashion in vogue in Eastern Canada, and left unharrowed and exposed until seeding operations were undertaken, were invariably productive of very unsatisfactory results. The warm winds, sweeping over the land, dried out the naked exposed furrows, while the stubble that had recently been turned in, cut off almost completely any communication between the subsoil and the furrow soil, as a result of which a dry season was most disastrous to the growing crop. The proper practice, and the one followed by the best farmers, is to harrow immediately after plowing, or, in fact, at the same operation, which not only assists in packing the soil, but also in placing it as quickly as possible in a condition where evaporation is reduced to a minimum. This, followed by successive harrowings and careful packing, usually produces on an average year from twenty-five to thirty bushels of wheat to the acre, if too generous seeding is not indulged in. All these aids, having in view the conserving of soil moisture, the promoting of capillarity, and the solidifying of the seed bed, produce most satisfactory results.

#### *Good Yields from Summerfallow.*

No one could believe the beneficent effects of such tillage until he had actually experienced them. As an instance in point, let me tell you of the experience of a prominent early pioneer. During the early settlement of Saskatchewan the rainfall, particularly in the western half of the province, was so limited, that many farmers became convinced that cereal growing could never be carried on successfully without supplementing in some way the scant precipitation. Sir Lester Kay, who was managing a number of farms along the Canadian Pacific Railway, equipped his several farms with water carts in the vain hope of furnishing in this way an adequate supply of moisture. At the same time, or at least in nearly every season, there was falling from the heavens sufficient moisture for the growth of his crops, but his method of tillage permitted this moisture to evaporate. All that was required to absorb and retain it for subsequent use was an intelligent method of soil culture.



As a proof of this let us refer to the experience of the Experimental Farm at Indian Head. There, there has been kept more reliable data in connection with the growing of cereal crops with a limited rainfall than are available in other parts of the province. These records show remarkable success even in the driest seasons. For the purpose of this article and to invite comparison between the crops of Saskatchewan and those of any other state or province where the rainfall is even much greater, I cannot do better than to quote Superintendent McKay's figures in connection with the operation of this Experimental Farm during the last nineteen years. They are as follows:

| Year | Rainfall<br>Inches* | Red Fife<br>Bushels<br>Fallow | Wheat<br>per acre<br>Stubble | Oats<br>Bushels<br>Acre |
|------|---------------------|-------------------------------|------------------------------|-------------------------|
| 1891 | 14.03               | 35                            | 32                           | 73                      |
| 1892 | 6.92                | 28                            | 21                           | 51                      |
| 1893 | 10.11               | 28                            | 21                           | 51                      |
| 1894 | 3.90                | 17                            | 9                            | 34                      |
| 1895 | 12.28               | 41                            | 22                           | 95                      |
| 1896 | 10.50               | 39                            | 29                           | 97                      |
| 1897 | 14.62               | 33                            | 26                           | 69                      |
| 1898 | 18.03               | 32                            | xx                           | 85                      |
| 1899 | 9.44                | 33                            | xx                           | 84                      |
| 1900 | 11.74               | 17                            | 5                            | 55                      |
| 1901 | 20.22               | 49                            | 38                           | 117                     |
| 1902 | 10.73               | 38                            | 22                           | 87                      |
| 1903 | 15.55               | 35                            | 15                           | 119                     |
| 1904 | 11.96               | 40                            | 29                           | 85                      |
| 1905 | 19.17               | 42                            | 18                           | 107                     |
| 1906 | 13.21               | 26                            | 15                           | 87                      |
| 1907 | 15.03               | 18                            | 18                           | 72                      |
| 1908 | 13.17               | 29                            | 14                           | 78                      |
| 1909 | 13.96               | 28                            | 15                           | 92                      |

\*This precipitation is exclusive of snowfall.

xx No record.

Notwithstanding the fact that during the nineteen years the average annual rainfall of the summer months, as shown by the above statistics, has only been 12.88 inches, the average yields for both wheat and oats, 32 bushels and 82 bushels respectively, are truly remarkable under such circumstances.

Lest it be contended that the result on a government operated farm is not a fair indication of what should be done under ordinary circumstances, permit me to refer to the record under similar conditions on my own farm some twenty-five miles north of Indian Head. These are as follows:

| Year | WHEAT<br>Bushels<br>per acre |
|------|------------------------------|
| 1891 | 30                           |
| 1892 | 28                           |
| 1893 | 34                           |
| 1894 | 24                           |
| 1895 | 26                           |
| 1896 | 31                           |
| 1897 | 35                           |
| 1898 | 27                           |

## WHEAT—Continued.

| Year      | Bushels<br>per acre |
|-----------|---------------------|
| 1899..... | 33                  |
| 1900..... | 25                  |
| 1901..... | 51                  |
| 1902..... | 23                  |
| 1903..... | 31                  |
| 1904..... | 35                  |
| 1905..... | 36                  |
| 1906..... | 38                  |
| 1907..... | 15                  |
| 1908..... | 16                  |
| 1909..... | 23                  |

*The Summer Rainfall.*

These yields, in the case of the Experimental Farm, as well as of my own, have been produced on either fallow or early done breaking or back-setting.

The average rainfall during the growing season for the whole province throughout the last eleven years was 12.71 inches, or practically the same as the record at the Experimental Farm during the nineteen years which was shown in the previous table to be 12.88 inches. From the year 1883, that is, the first season in which any considerable crop was grown in Saskatchewan, down to 1891, the first year that any record of precipitation was kept, there was a series of years that were even drier than the subsequent years, and yet, under these improved methods of tillage splendid crops were grown, ranging from twenty to forty bushels of wheat to the acre. The years 1886 to 1889 were particularly dry, and while no record was kept of the rainfall, it is thought that not over two or three inches of rain fell during the growing season of either year; and yet and many others had from fifteen to thirty bushels of wheat to the acre on well tilled land.

Even after marked success with grain growing had attended the efforts of the farmers in the older districts, it was still thought that the greater portion of the western half of the province was totally unsuited for agricultural purposes, as it was generally believed to be more arid than the eastern half. But as time passed, and better methods of tillage were introduced, and settlers continued to flock in from all directions, this hitherto shunned district was gradually overrun with settlers, who, as pioneers, have since made a pronounced success, as did their brethren in the eastern half of the province. It may here be noted that in the north-eastern quarter of the province where the soil is richer in vegetable matter, and is more alluvial in character and the precipitation is greater, the need for such frequent and thorough summerfallowing is not so apparent.

*The Present Development.*

And so, practically the whole of the province has now been proven to be not only fit for settlement, but also capable of producing the highest quality of cereals that find their way into the world's market.

Instead of being, as we were ten years ago, a struggling settlement, with only a handful of people and with a total output of only about 9,000,000 bushels of grain, we are now a thriving, vigorous, rapidly



growing community of approximately 400,000 souls, and increasing so rapidly that it is only a matter of time until we shall have a population of millions and a production of grain hovering around the billion mark.

When it is considered that we have this year reaped practically 200,000,000 bushels of all kinds of cereals from one-tenth of the arable land of this province, the enormous agricultural possibilities of the country, and the likelihood of its becoming a determining factor in the grain markets of the world can be understood.

Not only are we growing grain, but the province is becoming famous for its high class of horses, and its well-bred cattle. Indeed, all branches of farm husbandry, including sheep, hogs, poultry, horticulture and forestry, are being engaged in more generally, with advantage not only to the farmers, but also to the province as a whole.

As the experimental and speculative season has largely passed away, its place is being taken by a more general desire to establish permanent and beautiful farm homes, surrounded by fertile fields, commodious farm buildings and picturesque shelter belts, all of which contribute to make the lot of the farmer in Saskatchewan an enviable one indeed.

## SECOND ADDRESS

Delivered Before the Fifth Dry Farming Congress at Spokane,  
Washington, October 5, 1910.

### SASKATCHEWAN AS A FIELD FOR DRY FARMING OPERATIONS.

#### *Explanation of What "Dry Farming" Is.*

Whether or not the term "dry farming" has come to stay is immaterial, but the fundamental principles that underlie this system of farming will endure forever, with, of course, such variation in detail as location and the evolution of time may warrant.

Some sensitive people dislike the term "dry farming" on the ground that it is a reflection on their country and an admission to the world at large that their district is subject to drought. Admitting that this is correct, is it not better to face the situation boldly and prepare for it on the principle that "forewarned is forearmed" and that nothing in the end is gained by pretending to have what you have not? The meteorological records of Saskatchewan go to show that we have an average annual precipitation of about seventeen inches, and there is no getting away from the fact that this is usually looked upon in more humid countries as only about one-half the amount necessary to grow profitable crops. Thus the climate of Saskatchewan is sufficiently dry that until a few years ago it was thought to be impossible to grow cereal crops in the greater portion thereof. Intelligent tillage methods, however, timely applied, have demonstrated in every district that crops can be grown with very much less precipitation than was supposed, provided the moisture is systematically and economically taken care of. As a matter of fact the dryness of our seasons is, in one sense, our salvation, as reasonable drought is essential in most districts to insure the maturity and saving of cereal crops in our ordinarily short growing seasons. But a dry climate to be a blessing must be prepared for, otherwise it will blight and disappoint the hopes of the husbandman.

Since dry farming has become a popular term, and its principles recognised as scientific, many critics have claimed that this method involves nothing more or less than the methods that our fathers followed in eastern or other climes, known as "good farming." While it is admitted that dry farming is good farming, it cannot, however, be claimed that good farming is necessarily dry farming. Good farming in some countries may consist among other things of getting rid of superfluous moisture; while dry farming, among other things, always involves economising nature's water supply. In all semi-arid regions the besetting hindrance to successful farming is drought, consequently the basic principles underlying dry farming must and do imply a system of scientific and timely tillage, such as will best offset the dangers of scanty precipitation—in other words, we must accomplish in

the growing of crops with an average annual precipitation of seventeen inches, what more humid countries accomplish with a much more generous rainfall.

#### *Variations in Method But Not in Principle.*

In the pioneer days of Saskatchewan scores and hundreds of settlers left the country believing that no solution of this problem was within the realm of probability; but, as has often previously proven the case, "necessity was the mother of invention," and the sturdy pioneer farmers of those days, assisted by the experimental farms and agricultural press, demonstrated very clearly that our strong, retentive, heavy clay soil was capable of producing good crops with very much less even, than seventeen inches of annual precipitation. While this is true, it must be admitted that this could not be done year after year in succession without stopping at varying intervals of three or more years, and storing up moisture under a system of approved and improved modern summer tillage (commonly called summerfallow) that will be alluded to later.

Some writers have undertaken to lay down a hard and fast rule with regard to the best method of tillage to pursue under semi-arid conditions; but, so far as Saskatchewan is concerned, such rigidity applied to our varying soils, altitudes, exposures, precipitation and climatic conditions would only lead to loss and disappointment. Variations in method must and can be pursued without departing from principles, and herein lies the importance of every farmer understanding something of the science of soil physics in order to have the ability to prescribe such crops and tillage methods as will meet the requirements of his particular farm, just as a physician prescribes to suit the individuality of his patient.

#### *Four Features Noted.*

The following features usually identified with dry farming where longer and warmer seasons prevail than in Saskatchewan, and considered by some to be fundamental, should be carefully noted as to their applicability where fat lands and shorter growing seasons are the general rule:

First—Summerfallowing at intervals of every third year, or thereabout.

Second—Deep ploughing.

Third—Deep sowing.

Fourth—Thin sowing.

An examination of these points in some detail might be profitable at this time.

#### *The "Dry-Farm" Summerfallow.*

The modern summerfallow was introduced into Saskatchewan over twenty-five years ago, not for the purpose of renewing a worn-out soil, as was once commonly thought, but for the purpose of getting the soil into the best condition to absorb moisture and then holding it there for the use of succeeding crops. Thus the shortage in each years' precipitation was overcome and full crops ensured. In order to do this thoroughly and most effectively in Saskatchewan it was found that the land intended for fallow after receiving some form of fall tillage, should

be ploughed as early as possible in the spring after seeding that it might be in the most receptive condition to fully absorb and save from waste all the early and later rains. This should be immediately followed by surface tillage to put the necessary nonconducting soil mulch on the top, to intercept capillary movement, and prevent loss of moisture by evaporation. By this system the soil, if thoroughly and intelligently handled, will be found moist to a depth of five or six feet, and a sufficient amount of moisture for the growing of at least two successive crops is secured, even though drouth should occur. This system was practised for many years and is to a large extent in vogue yet. In the annual report of the Indian Head Experimental Farm as long ago as 1889, Superintendent McKay, in speaking of the best tillage methods to pursue in the then North-West Territories, says in part as follows:

"Our seasons point to only one way in which we can in all years expect to reap something. It is quite within the bounds of probability that some other and perhaps more successful method may be found, but at present I submit that fallowing the land is the best preparation to ensure a crop. Fallowing land in this country is not required for the purpose of renovating it, as in the case with worn-out lands in the east, and it is a question yet unsettled how much the fallows should be worked, but as we have only one wet season during the year it is found beyond doubt that the land must be ploughed the first time before this wet season is over if we expect to reap a crop the following year. . . . Land ploughed after July is of no use whatever unless there is rain in August, which very seldom comes to any great extent. A good harrowing should succeed the ploughing and all weeds or volunteer grain be kept down by successive cultivation. Above all, it is of the greatest importance that the first ploughing should be deep and done in time to receive the June or July rains."

Thus it will be seen that the more important foundation principles of dry farming were understood and practised in Saskatchewan years ago, although much improved upon since.

#### *The Summerfallow is Wasteful.*

But with the passing of time, cheap land, root fibre and humus, many advanced and thinking farmers are now searching for a more economic, permanent and less extravagant system of farming. The profitable returns under this method have caused land values to increase rapidly, so that now it seems a waste of capital to have one-third the tillable acreage idle each year. Furthermore, this system, while restoring nothing to the soil, rapidly dissipates its humus, and thus, as the years go by, reduces its capacity to absorb and retain moisture. While summerfallowing is recognised yet as the very foundation stone of successful agriculture in Saskatchewan, still it can and will, I believe, be supplemented by other intelligent tillage methods which will lengthen the time between fallowing seasons and obviate the necessity of such a large acreage being idle each year. If the care that is put on summerfallow to conserve moisture be followed up in each succeeding year by fall discing immediately the harvest has been taken off, and by a more generous use of the diamond harrow at every

available opportunity—even in many cases after the grain is up in the spring, and by packing, the reserve of moisture in the fallow could be made to extend over a much longer period than two years. Instead of summerfallowing a quarter section five inches deep every third year, would it not be more economical to fallow one-half that amount say ten inches deep, thus assuredly storing up a much larger amount of moisture and extending its benefits over a longer term of years? The more frequent use of the disc and drag harrow before referred to would not only help to control evaporation but also kill innumerable weeds that frequently prove such a continual drain on the soil moisture. To plough ten inches deep could only be advantageously done in Saskatchewan by subsoiling, and this will be referred to under the next heading.

#### *Principles Governing Depth to Plow to.*

Too much indiscriminate advice to plough deeply under all circumstances in Saskatchewan would be unwise and misleading, and must meet with disappointing results; but that all clay soils should be stirred deeply at least once after being broken up is becoming more and more apparent. Deep ploughing to increase the soil's capacity to store moisture at intervals of say ten or twelve years, to be followed by shallow ploughing or surface tillage in intervening years to hasten early maturity, is now thought to be the ideal method in many localities. The danger of too frequent deep ploughing is obvious. Should it be followed by a dropping season the growth of straw will be too rank, and maturity retarded, which tends to run the crop into the period of early fall frosts before harvesting is completed. Nevertheless deep tillage is necessary to provide against drought particularly, and will be accompanied by the risk of slow maturity only in the first succeeding crop. This risk could be offset by special attention to packing and growing for the first year crops suited to such a condition of soil. During the subsequent eight or ten years the land should be ploughed to a normal depth of say four to five inches, which will tend to hasten maturity and yet provide a satisfactory seed-bed.

I believe that subsoiling will become in time a recognised necessity, particularly in our heavy clay soils that are under shallow tillage, comparatively impervious to moisture. Under present conditions a great deal of the copious rainfall of June and early July runs off into adjoining sloughs, creeks and coulees and is lost, whereas if subsoiling had been performed even once this excess of rain would freely percolate into the soil as it fell and remain there in reserve to be drawn upon during a period of subsequent possible drought. This is one way whereby all of us may assist in conserving one of the most important natural resources of our semi-arid open plains—the rain and snowfall.

#### *Depth at Which to Sow Seed.*

We do not know who is responsible for teaching the agricultural heresy that sowing deeply insures the crop against drought. The argument implies that a shallow rooting plant can be converted into a deep-rooting one simply by planting deeply. But anyone who has given any attention to cereal growth must have noticed that any of the



small grains, if planted in a moist soil deeper than about two and one-half inches, will, immediately upon showing the surface growth, assert its shallow growing tendencies by throwing out a new set of rootlets about one and one-half or two inches below the surface or immediately below the moisture line. Thus with us it is a mistake to sow too deeply with the idea that such a practice assists in resisting drought. In addition, too, this too deep sowing has other serious disadvantages, such as delayed germination, disposition to smut, tardy maturity and a weakened vitality of the plant generally.

#### *Quantity of Seed to Sow Per Acre.*

All the best thinkers in the dry farming world claim that better results can be secured from moderately thin than from thicker sowing. The usual reasoning of those who support thick sowing as being best in dry countries is that it will produce a heavy thick foliage, which by quickly and thoroughly shading the ground economises and conserves much moisture. But a little inquiry into this popular fallacy will soon dispel it. Recognising that the moisture supply is our limiting factor in crop production, with a given amount in a cubic yard of land it is obvious that, say fifty plants, will exhaust that moisture more quickly than a lesser number would do, as each plant is a miniature suction pump continually drawing upon the soil moisture and evaporating it through its leaves. This process is accelerated by the dry winds which sometimes blow during the hot summer. Given, however, a good reserve of moisture in the land and a reasonable number of plants thereon, the ill effects of such drying winds are not only averted but turned to good account by stimulating rapid maturity. Were the cubic yard of soil in question loaded with one hundred plants instead of fifty it is evident that its moisture would be exhausted in about half the time, and that the supply would be insufficient to meet the heavy demands made upon it during a period of drying winds and excessive evaporation. On the other hand, if the cubic yard of soil has been deeply worked in a district where the soil is peculiarly retentive of moisture and precipitation is unusually generous, too thin sowing would induce excessive stooling and correspondingly delayed maturity, both of which must be avoided in Saskatchewan.

What then should govern us in the amount to sow? If our previous reasoning is correct, that thick sowing is likely to be more susceptible to damage by drought, while too thin sowing runs one into danger by frost, this is a question in the solving of which the tiller of the soil will require to exercise sound judgment, based upon local conditions. As much discretion as would be used in loading a team for a trip to market should be exercised in determining the amount of seed to be sown on an acre of land, for as many factors enter into the question. Just as the weight, condition and temperament of the team, the nature of the load and condition of the wagon, the character of the trail, its present condition, its length, and the weather on the day in question, all enter into the decision as to what load shall be hauled, so the mechanical condition of the field, its probable reserve of moisture, the stage to which the season has advanced, the presence or absence of weeds, and the variety of seed being used are among the factors that must be



considered by the careful farmer when he is determining the quantity of seed he will sow to the acre. In short, land should be sown according to its known capacity to carry a large or small crop. Experience has demonstrated that in Saskatchewan the quantity of wheat to be sown per acre should vary from three pecks to two bushels, of oats from six pecks to three bushels, and of flax around two pecks.

#### *Lessons of the 1910 Crop.*

In Saskatchewan the season just closed has given ample and profitable opportunities to study the system of dry farming practised here as against the methods of newer settlers who have brought their old-time practices with them; and who invariably let go old methods with a great deal of natural reluctance. While the eastern half of Saskatchewan, being that portion east of the third meridian, certainly had slightly more precipitation than the western half this season (15 and 11 inches respectively), that fact in itself does not account for the marked difference in the crops in these respective areas. A great portion of eastern Saskatchewan has been settled for from ten to twenty-five years, and farmers located therein are familiar with the best methods of tillage necessary to secure the best results under semi-arid conditions. In the western and newer portion, however, large tracts of land have recently been taken up by settlers unfamiliar with such conditions, or possibly insufficiently equipped, with the result that such have experienced some loss and disappointment during the summer of 1910, and yet ample rain fell practically throughout the whole province to give profitable and satisfactory results, had the principles underlying dry farming been understood and carried into effect. Saskatchewan, however, as a whole has a magnificent crop, even with the dry season it has just passed through. Where approved methods of tillage have been practised the results have been most gratifying—the yield in many localities running from twenty-five to forty bushels of wheat to the acre, while the provincial average on acreage sown will not exceed approximately fifteen bushels. Had the principles of scientific farming been observed throughout the whole province, it is believed that the total yield of wheat for this season, instead of being approximately seventy millions, would have bordered around the one hundred million mark. But the newer settlers are not discouraged by any means, as they see what has been accomplished by the occasional experienced settler, one or more of whom is to be found in almost every new locality. With such innumerable illustrations to be found on all sides in Saskatchewan during 1910 of the imperative necessity of employing dry farming methods, if best and most satisfactory results are to be obtained, it is confidently expected that the cause of scientific soil culture will be given such as impetus that it will be only a matter of a few years until practically all will accept its teachings.